

Highly Efficient, Solid State Hydrogen Purification for Resource Recovery, Phase I

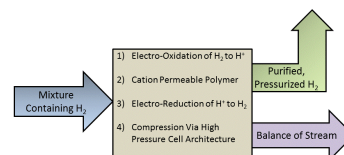
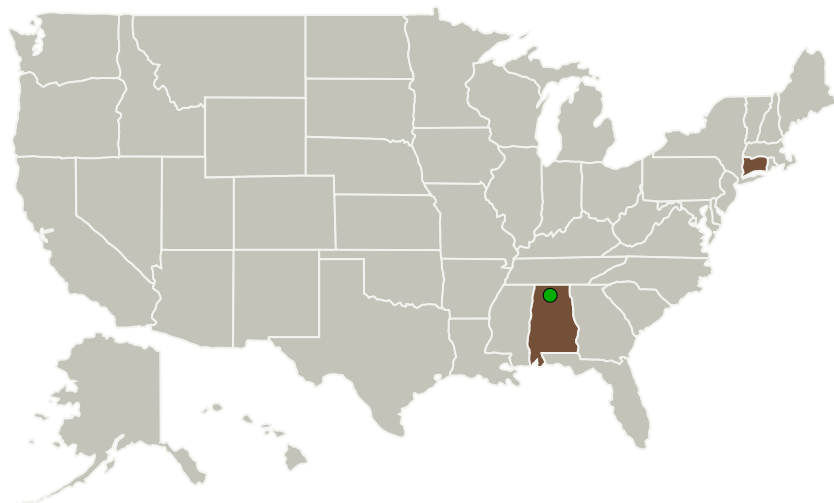
Completed Technology Project (2014 - 2014)



Project Introduction

Sustainable Innovations' signature electrochemical cell architecture provides a solution to NASA's search for regenerative separation technology enabling maximum hydrogen recovery from a stream containing water vapor (saturated), carbon monoxide (CO), and hydrocarbons including methane, acetylene, ethane, and ethylene, among others. Separation of hydrogen from mixed gaseous streams presents a significant technical challenge for various NASA applications. In addition, the ability to efficiently perform hydrogen purification presents an attractive economic opportunity. Sustainable Innovations is developing a technology that extracts hydrogen from a mixed stream by electro-oxidization of the hydrogen and subsequent electro-reduction of the resultant protons in a separate chamber. The process, when combined with an electrochemical cell architecture that is engineered to tolerate high differential pressure, can be used to separate and compress hydrogen in a single step. The process is proven to be efficient, quiet, and highly reliable. It requires no reciprocating compressor, so it is largely maintenance free.

Primary U.S. Work Locations and Key Partners



Highly Efficient, Solid State Hydrogen Purification for Resource Recovery Project Image

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Organizations Performing Work	Role	Type	Location
Sustainable Innovations, LLC	Lead Organization	Industry	East Hartford, Connecticut
● Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama
Skyre Inc	Supporting Organization	Industry Small Disadvantaged Business (SDB)	

Primary U.S. Work Locations

Alabama	Connecticut
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Project Transitions

**June 2014:** Project Start**December 2014:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/140541>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Sustainable Innovations, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

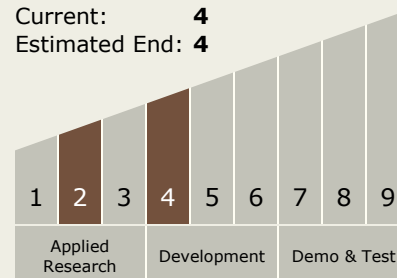
Joshua Preston

Technology Maturity (TRL)

Start: 2

Current: 4

Estimated End: 4

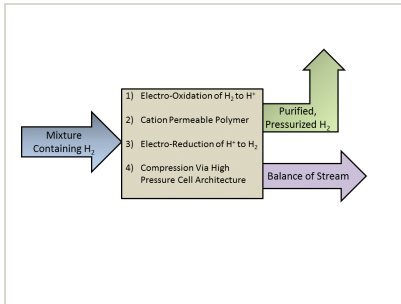


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Images



Project Image

Highly Efficient, Solid State Hydrogen Purification for Resource Recovery Project Image
(<https://techport.nasa.gov/image/126501>)

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
 - └ TX06.1 Environmental Control & Life Support Systems (ECLSS) and Habitation Systems
 - └ TX06.1.1 Atmosphere Revitalization

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System